

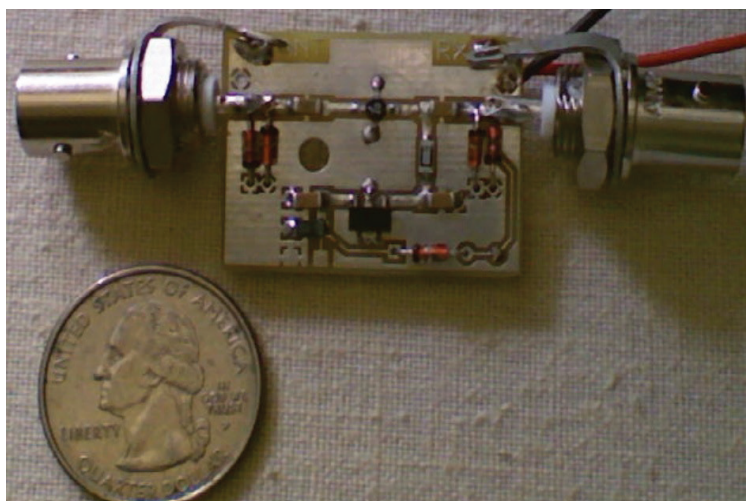
The AMSAT[®] Journal

Volume 35

November/December 2012

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Assistant Editors
Douglas Quagliana, KA2UPW/5
Mike Sedlak, K4ERA
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VHF/UHF Preamp for satellite work coming to AMSAT ...



AMSAT @ PACIFICON 2012

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Call the AMSAT-NA office at 301-589-6062 for questions on any or all of these ways you can help build new and exciting satellites.

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AMSAT Announcements

AMSAT Board Elects Senior Officers for 2012

Election of AMSAT's Senior Officers was one of the first orders of business completed at the AMSAT Board of Directors meeting on October 25, prior to the start of the 2012 AMSAT Space Symposium held in Orlando, Florida.

The following positions were voted upon and filled:

Barry Baines, WD4ASW	President
Drew Glasbrenner, KO4MA	Vice-President Operations
Gould Smith, WA4SXM	Vice President User Services
Tony Monteiro, AA2TX	Vice-President Engineering
Frank Bauer, KA3HDO	Vice-President Human Spaceflight
Mark Hammond, N8MH	Vice-President Educational Relations
Alan Biddle, WA4SCA	Secretary
Keith Baker, KB1SF/VA3KSF	Treasurer
Martha Saragovitz	Manager

These Senior Officer positions remained open at this time awaiting appointments:

Executive Vice President
Vice-President Marketing

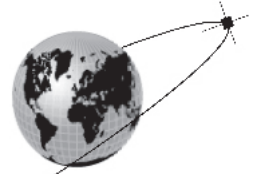
AMSAT's Mission

AMSAT is a non-profit volunteer organization which designs, builds and operates experimental satellites and promotes space education. We work in partnership with government, industry, educational institutions and fellow Amateur Radio societies. We encourage technical and scientific innovation, and promote the training and development of skilled satellite and ground system designers and operators.

AMSAT's Vision

Our Vision is to deploy satellite systems with the goal of providing wide-area and continuous coverage. AMSAT will continue active participation in human space missions and support a stream of LEO satellites developed in cooperation with the educational community and other amateur satellite groups.





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Second Alternate: **Patrick Stoddard**, WD9EWK, wd9ewk@amsat.org

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Vice-President User Services: Gould Smith, WA4SXM

Vice-President Human Spaceflight: Frank Bauer, KA3HDO

Vice President, Educational Relations: Mark Hammond, N8MH

Honorary Positions

Immediate Past President: Rick Hambly, W2GPS

President Emeritus: Tom Clark, K3IO

Founding President: Perry Klein, W3PK

Editorial Office: JoAnne Maenpaa K9JKM, 608 Hawthorne Lane, Carpentersville, IL 60110. Please e-mail Journal submissions to: journal@amsat.org, Editor's telephone: 847-239-2286 (cell). **Advertising Office:** AMSAT-NA Headquarters, 850 Sligo Avenue, Suite 600, Silver Spring, MD 20910-4703, Telephone: 301-589-6062.

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The AMSAT Journal staff is always interested in article submissions. Whenever possible, submissions should be sent via e-mail to journal@amsat.org using plain text or word processor files; photos or figures in TIF, GIF or JPEG formats. Kindly do not embed graphics or photos in your manuscript - we prefer receiving those as separate files. AMSAT-NA reserves the right to select material for *The AMSAT Journal* based on suitability of content and space considerations. The editors of this publication are volunteers giving freely of their talents, time and efforts to produce *The AMSAT Journal*.

The Journal is Back!

You've undoubtedly noticed that you were not receiving the customary six issues of *AMSAT Journal* in your mailbox over the past twelve months. Indeed, the November/December 2011 issue was released in July 2012 and nothing has been released with a 2012 publication date until now, at the end-of-year. Clearly, this aberration in our publishing is a major concern.

Here's the background....

The last issue under the editorship of Ed Long, WA4SWJ was the November/December 2011 issue. As I noted in my prior *Apogee View* column, that issue was delayed by the lack of material to be published. New sources of articles are needed.

Consequently, when Ed submitted his final issue to the printer to complete nine years of editorship, that issue wasn't completed until July 2012. Meanwhile, back in November 2011 we announced that Doug Loughmiller, W5BL would be the new editor starting with the Jan/Feb 2012 issue. Since his appointment, Doug was spending time getting organized to take over the *Journal* once Ed completed his last issue. Articles that had accumulated over the past few months were forwarded to him for inclusion in an upcoming issue once Ed had completed his work.

Then reality sunk in. Doug, a volunteer with other "real life" responsibilities found himself dealing with more immediate work issues which caused him not to focus on his new AMSAT position. There is also a real learning curve in dealing with editing software if you haven't done this type of work previously. Expected deadlines were not met and it became painfully obvious to Doug and the AMSAT leadership that despite his best intentions, Doug was not in a position to fulfill his new duties in a timely manner. Doug formally submitted his resignation as Editor the day before the AMSAT BOD Meeting.

Clearly, while I'm disappointed that this position did not work out, I told Doug that I hoped we could use his considerable skills in the future in a way that was beneficial to both AMSAT and personally satisfying for Doug. As a former AMSAT President, Doug is familiar with the challenges of accomplishing significant tasks with an all-volunteer organization.

Fortunately, I had spoken with JoAnne Maenpaa, K9JKM the prior week. During

our conversation, she made it clear from the onset that she wanted to take on the task of Editor. Needless-to-say, I was thrilled to learn of her desire to take over the *Journal* and I informed those in attendance at BOD meeting of her appointment as editor on 25 OCT as well as noted her appointment during the AMSAT General Membership Meeting that was held on Saturday afternoon, 27 OCT and broadcast via EchoLink.

We all know JoAnne from the considerable work she has done for the *AMSAT News Service*. Her ANS team has created a weekly dissemination of AMSAT news and information that has worldwide distribution. She knows how to get a team moving together and puts in the hours needed to get things done. She enjoys working with people and is highly regarded for her overall ability to work in a challenging environment.

Consequently, only a few weeks after her appointment as the new editor, JoAnne has completed her first issue using materials that had been submitted previously.

Looking forward...

We are keenly aware that we have not fulfilled our Journal publication commitment in 2012. Given the late timeframe for publishing this issue, we've decided to make this issue the only one with a 2012 publication date. To compensate for the five other issues not published in 2012, we are substituting the Proceedings of the AMSAT-NA 30th Space Symposium and AMSAT-NA Meeting, which took place October 26-28, 2012 in Orlando, FL. This publication is over 350 pages and contains a significant amount of material on Fox-1 as well as a variety of papers on ARISat-1, User Equipment and Ground and Satellite Ground Systems, Future Satellites and New Technology, and Satellites and Education. Arrangements are now being made for distribution of Proceedings to our membership, most likely in the form of a DVD, (hopefully) before the end of 2012. We are still working out the details as this issue of the Journal goes to press.

The decision to provide Proceedings is the best way for AMSAT to get the AMSAT Journal back on schedule in 2013. AMSAT members who have not attended an AMSAT Space Symposium in the past will hopefully

continued on page 9 ...



Mark Spencer, WA8SME, ARRL Education & Technology Program Director
mspencer@arrl.org, 860-381-5335, or on the birds

Here is an inexpensive broadband receiver preamp that you can build and use to improve your satellite operating experience. I've included a few different configurations for using the preamp, with one or more diplexers, depending on your choice of radio and choice of antenna (ARROW style, or Elk style antenna).

This simple broadband preamp has served me well for years. It was designed by Glen Gardner, AA8C, and first published in the May/June 2004 issue of QEX. The simplicity of the circuit fit the bill nicely and met my requirements. However, in the presence of strong out of band signals, the preamp, which was based on the MAR-6 device from Mini Circuits, tended to suffer from overload and would self oscillate. This wasn't a problem at my previous QTH which was out in the middle of no-where California. However at my new QTH in southeastern Connecticut, on the perimeter of a Navy Submarine Base and within a stone's throw of a commercial FM transmitter site, the simple MAR-6-based broadband preamp did not perform as well. The solution was relatively simple, switch the primary active component from the MAR-6 to the MAR-7 device.

While making the switch, I also made a few minor modifications to the circuit. The updated circuit diagram is shown in Figure 1.

A picture of the completed preamp board with "it all hanging out" is shown in Figure 2.

Figure 3 shows the preamp in a rugged metal enclosure.

In Figure 4 you can see the preamp alongside a home brew diplexer.

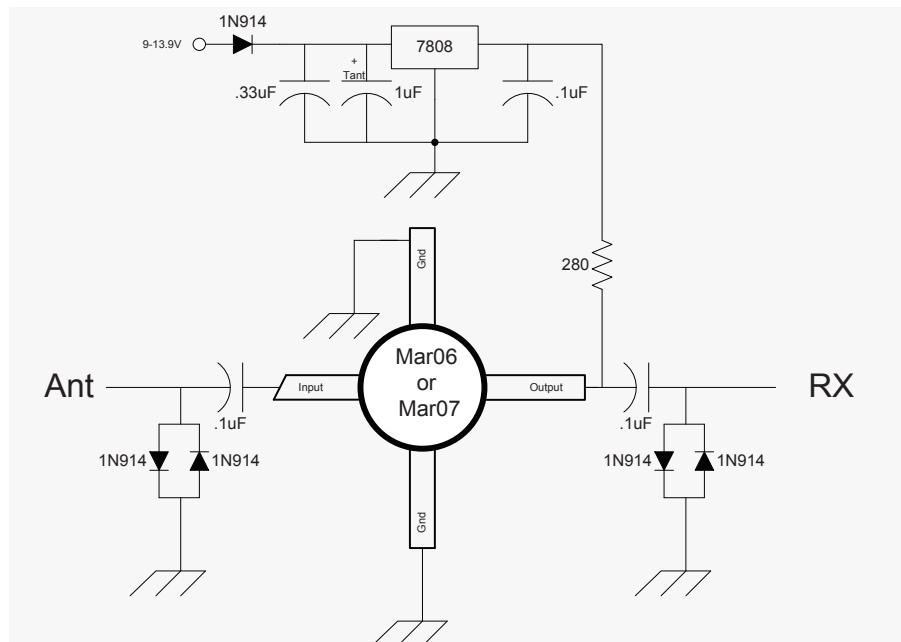


Figure 1: Preamp circuit diagram

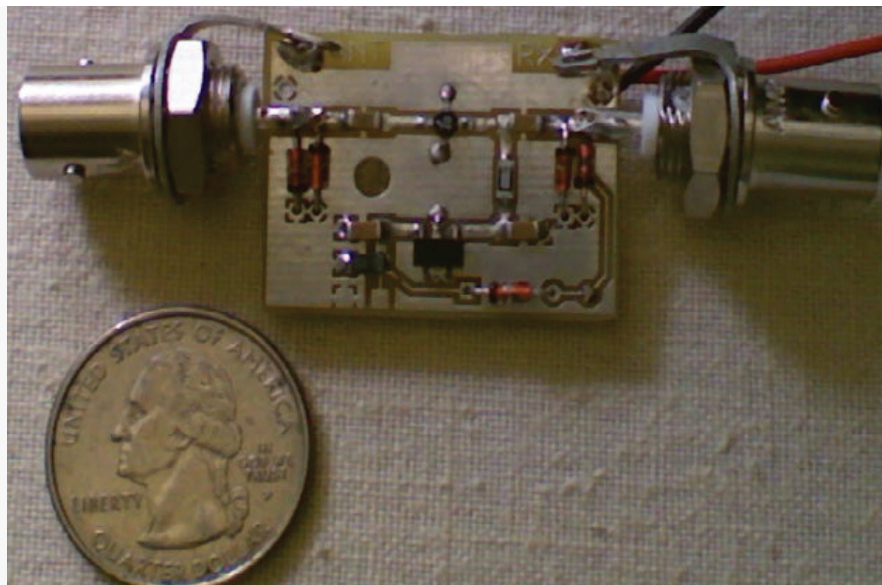


Figure 2: Completed preamp circuit board

This diplexer is based on a design published in the Nov/Dec 2009 AMSAT Journal by Ron Cade, W6ZQ.

A blow-up of the circuit board pattern for the preamp is shown in Figure 5.

I've listed the parts, with the source part numbers, in Table 1. However you should be able to locate all of

the components at relatively low cost by searching the internet. The MAR Amplifier can be either a MAR-6 or MAR-7.

The project is made using surface mount components. But before you panic, the surface mount components used in this project are relatively large (my eyes ain't as good as they once were, and the darn things seem to shake on their own too for some

reason...so I feel your pain). The board layout is designed with hand soldering in mind. So if you have modest construction experience, the construction of this project is well within your reach.

Though I have done some gain measurements (around 15-20 dB of gain) with my limited test equipment, the real gain obtained is documented in anecdotal observations (see side bar by Mark Hammond, N8MH).

I do not want to reignite the preamp/no preamp debate, but for me, I find that a receive preamp is essential for “quality” satellite contacts. This is particularly important when doing demonstrations or working with novice satellite operators. This inexpensive preamp can make the difference between hearing the bird and completing a contact, or just listening to receiver noise.

The preamp can be powered by a fresh 9-volt battery making it very portable.

One of the issues when using a receiver preamp is how to configure it in the transmission line so that you can listen, and transmit, without damaging it. In this particular circuit design, crossed diodes are installed at the input and the output to clip short duration signals strengths to levels that will prevent damage to the preamp. I still would not want to transmit into the preamp at high power and for a long period of time. (The diodes only provide some “oh cr##” insurance when you inadvertently hit the PTT at the wrong time).

Figures 6 and 7 illustrate some configurations that might allow you to use the preamp in your particular rig/antenna configuration.

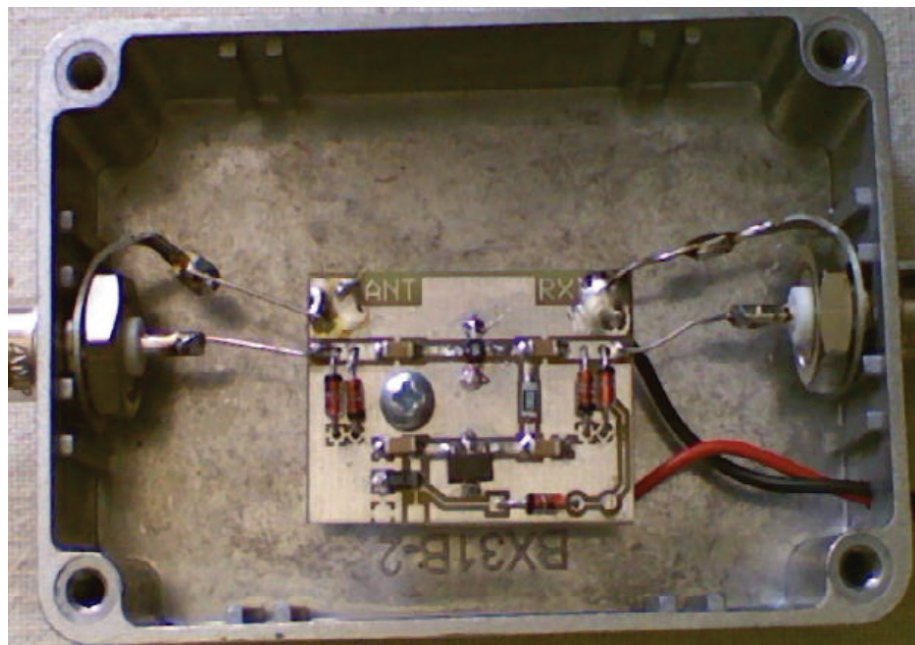


Figure 3: Preamp in a rugged metal enclosure.



Figure 4: Preamp alongside a home brew diplexer.

When using the preamp with an ARROW-like antenna (essentially two antennas mounted on a single boom), the configuration is pretty straight forward. You simply insert the preamp in the receiver line between the rig and the receive side of the antenna.

If you have a single antenna connector radio (the typical HT), the preamp would be installed downstream of the diplexer. When you change bands, you would need to switch the preamp to the coax for the other band.

Elk-like antennas are essentially a single, broad band log periodic antenna with a single feed point. In the case of an Elk like antenna with a single antenna connector HT, two diplexers would be required with the preamp between the diplexers installed in the appropriate band “loop” between the diplexers. There are of course, trade-offs with some insertion losses from the diplexers.

If you are interested in trying out the preamp but you are hesitant to “roll your own”, I’d like to offer an alternative on behalf of the ARRL ETP (Education and Technology Program) and AMSAT that could benefit you and at the same time benefit the development of future FOX satellites. Through the AMSAT store (beginning in mid-November) the ARRL ETP and AMSAT are cooperatively offering to supply the preamp at a low cost (plus postage) to those interested. Any funds collected over the actual cost will be used to fund the FOX satellite family.

The cost at the time this article was written is projected to be \$50 plus shipping for an assembled and tested unit in the metal enclosure. Additional contributions above the cost also go to the FOX project!

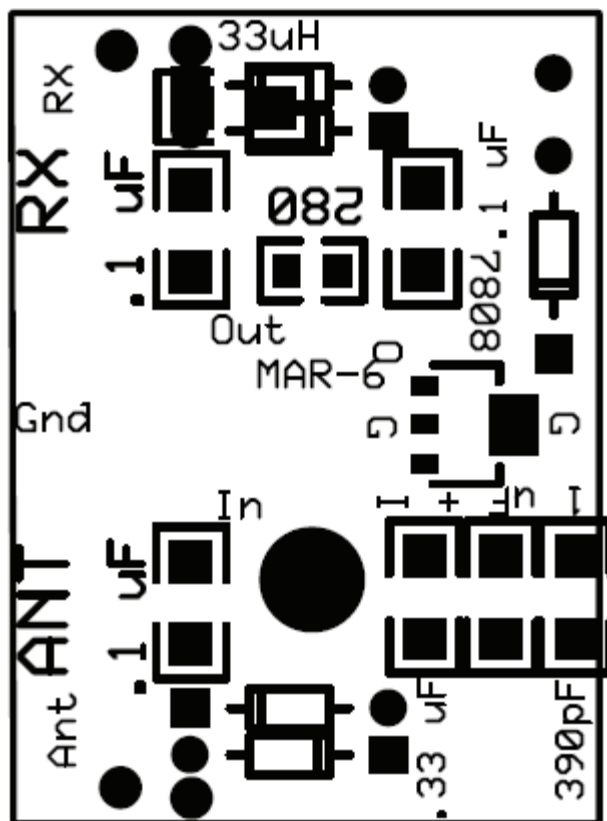


Figure 5. PC board layout for preamp (for illustration only - not scale.)

A preamp assembled and tested, but without the metal enclosure, is projected to be \$40 plus shipping. Assembly of these preamps is my personal volunteer effort in support of my fellow satellite enthusiasts. Please visit the AMSAT store at <http://store.amsat.org/catalog/> to place your preamp orders.

For those of you that have never used a receiver preamp with your portable satellite station, I urge you to consider doing so. Once you hear the difference, you will wonder how you did without it. 🌐

Table 1: Preamp Parts List			
Qty	Description	Part Number	Source
3	.1uF Capacitor	490-1775-1-ND	Digi-Key
1	.33uF Capacitor	445-4010-1-ND	Digi-Key
1	1uF Tantalum	493-2387-1-ND	Digi-Key
1	280 Ohm Resistor	P280FCT-ND	Digi-Key
1	7808 Regulator	296-11125-1-ND	Digi-Key
1	MAR-6 Amplifier	www.minicircuits.com	Minicircuits
5	1N914 Diode	1N914ACT-ND	Digi-Key
2	BNC Connector	A32344-ND	Digi-Key
1	9-V Battery Holder	BH9V-PC-ND	Digi-Key
1	Circuit Board		
1	Box	Mouser 563-CN-5701	Mouser

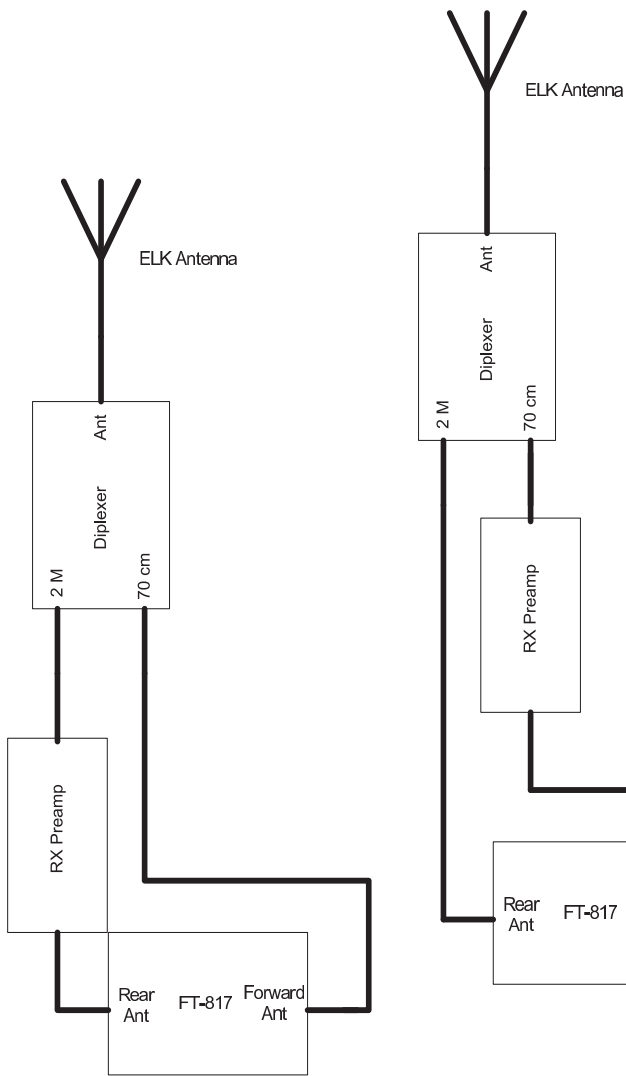
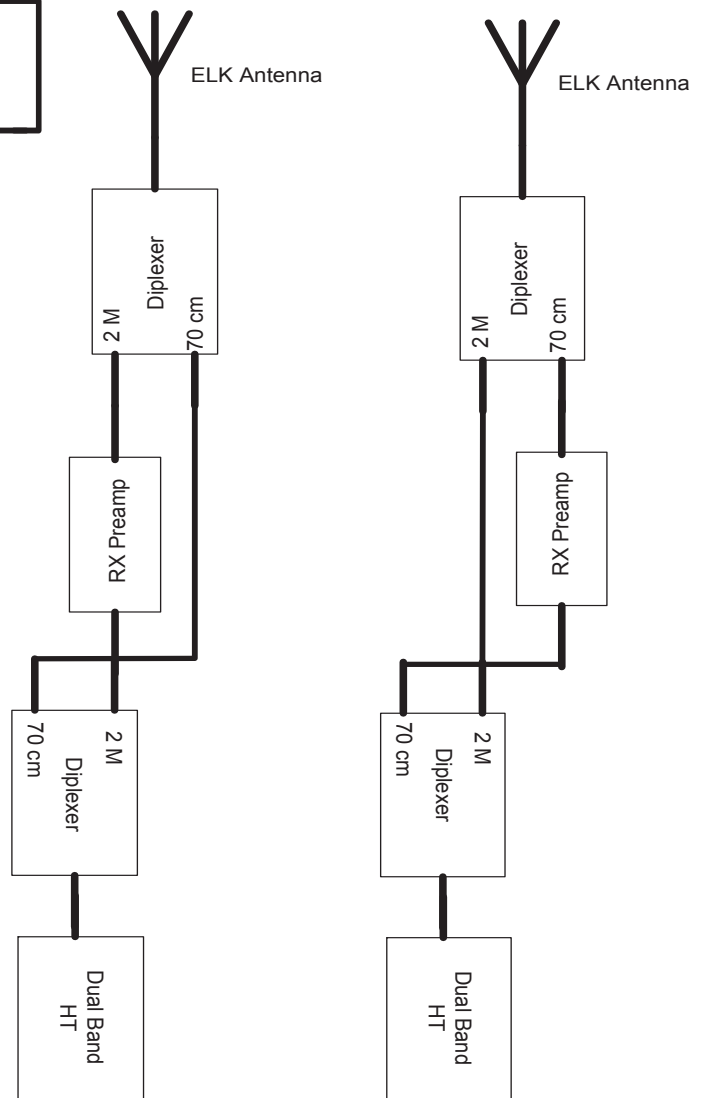


Figure 6 - (left) Elk antenna with diplexer and two antenna connector rig.

Figure 7 - (right) Elk antenna with two diplexer and single antenna connector rig (HT).



Side bar to: Inexpensive Broadband Preamp for Satellite Work

by: Mark Hammond, N8MH, AMSAT VP for Educational Relations

As a satellite operator that knows well the old adage, “if you can’t hear ‘em, you can’t work ‘em,” I naturally jumped at the opportunity to put Mark Spencer’s (WA8SME) new ARRL/ETP Broad Band Preamp through some on the air testing!

The first round of on the air testing of the preamp occurred during a ride to the beach. With my wife willing to drive, I tossed in the trusty FT-817ND radio, a $\frac{1}{4}$ wave 2M magmount antenna, the new preamp, a 9V battery, some jumper cables, and various BNC adapters. For these first tests, I limited operations to receive only because the preamp does not have a built in TX/RX bypass relay. I first caught a VO-52 pass (a 2M downlink), and using the preamp was simply the difference between hearing the bird, and not hearing it at all (note: when no power is applied to the preamp, there is some but very little pass-through of the signal; my simple testing and comparisons included removal of the preamp from the feed line, not just powering it OFF and ON). It was working beyond my expectation for such an inexpensive and broadband preamp. A subsequent AO-27 pass again illustrated how much the preamp could improve the downlink, but this time on a 70CM downlink! Multiple bands and a single preamp-very slick indeed, as one considers the application of mobile or portable operations.

I quickly shot off a mobile email to Mark WA8SME and let him know that the preamp was performing brilliantly. So much so, in fact, that the good signals received on the

little $\frac{1}{4}$ wave magmount tempted me to try a contact on the air. Keep in mind that I had to disconnect the preamp anytime I wanted to transmit. It quickly became apparent that without the preamp, I wasn’t going to be able to hear the bird; and with the preamp inline, I wasn’t going to be able to transmit. There had to be a solution...but first let me better explain the “problem.”

My goal was to figure out how to make use of the dual band preamp for

- 1) both modes U/v and V/u
- 2) a single radio (FT-817) that is half-duplex - and -
- 3) a single antenna, like the $\frac{1}{4}$ wave mag mount in a mobile, an Elk log periodic, or a “herringbone log periodic cheap yagi” by Kent Britain, WA5VJB (which I recently constructed)

Mark WA8SME and I did some brainstorming and came up with two pretty straightforward solutions for my operational situation, both of which involve a diplexer or two and a few cables. You can see the two scenarios in his Figures 6 and 7. With the FT-817, Figure 6 is possible (and was verified by Matt, N8MS) with a single diplexer, but candidly the idea of having to reprogram my frequency memories to ensure they used the right antenna jacks (front or back) seemed tedious and committal, not to mention the complication of switching between modes U/v and V/u.

The elegance of Figure 7 is that it’s a solution for any single band radio, including an HT. It does have the complication of requiring two diplexers, but the switch-over

between modes U/v and V/u is pretty easy. So for a second round of on-the-air testing, I lashed up the FT-817, a pair of diplexers, and the preamp to the Elk antenna with electrical tape and headed outdoors to attempt a contact. A photo of that setup can be seen in Figures 8 and 9. While a tad cumbersome, it definitely works well, as an on-the-air contact to Drew KO4MA was quickly made on AO-27.

Of course, another useful and attractive solution is to incorporate some type of RF switching. Sitting here on the bench is an old RF sensed relay board, sold long ago by Ramsey Electronics. Hopefully soon I can get that attached to the preamp. A quick look at the Ramsey website shows that a similar model is now being sold fully assembled (<http://www.ramseyelectronics.com/cgi-bin/commerce.exe?preadd=action&key=RFS1>). Their board is sized to fit into 1.5” PVC pipe, so be creative-for example, I can envision the preamp board, the RF switch, and a pair of 9V batteries slid into a PVC section, with SO-239 connectors on each end cap. That would pair nicely with the FT-817 and an Elk antenna or Herringbone Cheap Yagi.

Users of an Arrow Antenna (and dual band Cheap Yagi variants) have it a bit simpler because they really are two antennas in one; just put the preamp inline with the desired antenna-between the built-in diplexer and the antenna. Mode changes only require swapping the preamp and jumper to the other antenna.

In summary, the new ARRL/ETP



Broad Band Preamp is an affordable, durable, and great performing device for satellite operations. You'll be surprised when you hear what you've been missing!

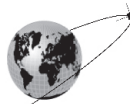
73,
Mark N8MH



Figure 8: N8MH setup using FT-817, Elk antenna, diplexers, and preamp.



Figure 9: N8MH setup ready to head outside.



Apogee View - continued from page 3 ...

be impressed by the depth and quality of the papers presented; please take the time to review the papers that are in this publication.

The resumption of the Journal under JoAnne's leadership is just the start to the road of regular publication. We still need articles to be submitted for publication, as JoAnne can't do this by herself. Please consider submitting an article, photos, etc. on satellite activities. If you're representing AMSAT at hamfests, write an article about that hamfest and what was done to highlight amateur radio in space. If you are involved with school activities and used amateur satellites as part of the educational experience, please tell us about it. If you have advice to give on building an amateur satellite station, please share it in an article. If you supported a DXpedition that included amateur satellite activity, please let us know about it. If you have home brewed some equipment as part of your satellite station, please share your experiences. The potential subject matter can be whatever you care to write about, keeping in mind that the audience are AMSAT members who are interested in space-related subjects.

With JoAnne's transition to the AMSAT Journal, Lee McLamb, KU4OS will become the team leader for "AMSAT News Service." Lee has been a member of the ANS team for a number of years. Lee is looking for additional volunteers to serve as weekly editors of ANS. Edwin M. "EMike" McCardell, KC8YLD has agreed to assist as a weekly editor, but we need at least one more additional volunteer to help spread the workload. We lost a key volunteer with the passing of Dee Intedonato, NB2F last Spring and now with JoAnne's work with the Journal, we are in need of an additional hand or two.

Other Items...

BOD Election

Thank you to those AMSAT members who participated in the BOD election process this summer. The new BoD met in Orlando prior to the 30th AMSAT Space Symposium. While the makeup of the BoD did not change, I am pleased that we had several new names on the ballot, reflecting not only a choice for members to make but also a developing depth of field for future AMSAT leadership.

Membership participation in the election was

around 25%. I hope that as AMSAT continues to move forward, that our members will take the time to consider the qualifications of those running in future elections and fulfill a key obligation of AMSAT membership by casting their votes.

Another ELaNA Opportunity

In November, AMSAT submitted a cubesat proposal to NASA for an "Educational Launch of NanoSat" (ELaNA) cubesat as part of the 2012 ELaNA program offering. Using the Fox-1 design, this new satellite will feature a radiation experiment from Vanderbilt University. We should know in late January or early February 2013 whether our proposal is accepted. Our intent is to use the Fox-1 flight spare as the primary spacecraft for this mission with launch in 2014. If selected, this would provide AMSAT with both a Fox-1 and Fox-1B flight opportunity. At this point, our Fox-1 satellite is still under development with an expected launch in late 2013. However, we have yet to be manifested. Stay tuned!

As noted during presentations at the AMSAT Space Symposium, AMSAT's current strategy is to find payload opportunities that provide the justification for launches and to partner with organizations (universities, commercial entities, etc.) that would use AMSAT's spacecraft design incorporating amateur radio. Depending upon the payload's data telemetry requirements, data from the experiment would be transmitted either at a low baud rate that would allow simultaneous amateur radio FM repeater operation, or use the higher speed 9600 BPS system that would not allow FM repeater operation at the same time. Under this scenario, for example, once the payload experiment is completed, then the satellite would be dedicated to amateur radio operation.

Meanwhile, AMSAT VP-Engineering Tony Monteiro, AA2TX continues to scan the horizon for other flight opportunities, such as the National Science Foundation or other funding sources. These grant opportunities are extremely competitive and it is clear that the chances for selection, even if the proposal is scored as having significant merit, is very low. However, we will continue to work through this process since selection would offer significant benefits to AMSAT and the opportunities for developing partnerships continues to evolve. Clearly, our efforts to "Keep Amateur Radio in Space" is causing AMSAT to look at flight opportunities differently than in the past and we must adapt to changing circumstances.

continued on page 20 ...



By Bob DeVarney W1ICW

Welcome to a brand-new column in the AMSAT Journal. Over the coming months, I will be exploring the ins and outs of Moonbounce, Earth-Moon-Earth, or simply EME, communications. I will include timely tech tips, news of upcoming operating events and DXpeditions, explore some of the fascinating and confusing aspects of the mode, share some personal observations and anecdotes, and lastly a list of the best and worst days of the months covered by that particular issue. There is a lot going on in the world of EME, including some world-rocking advances in amplifier design that have set the V/UHF world on its ear, continual developments in antenna design that have virtually eliminated extraneous noise from unwanted lobes in your antenna pattern, and of course the bewildering pace of Software Designed Radio improvements.

Before I delve into that, perhaps a word of introduction is in order. My name is Bob DeVarney, W1ICW, and I have been a licensed Amateur Radio Operator since 1980. I was first licensed with the call KA1FBJ in April of 1980. Being a young ham with limited funds, I was weaned on the older generation of tube radios including a Heathkit DX-60 and Knight VFO and R-100 receiver. My sister and brother-in-law, knowing my love of all things space-related, and also my new ham radio hobby, got me an AMSAT Membership that year for my birthday. The Journal in those days was called "Orbit" and although I didn't understand much of what was written, I surely knew

this was something I wanted to do some day. I still have that tattered but treasured magazine, and if you want to see how AMSAT has changed since then, Phil Karn KA9Q has been nice enough to put up an archive of early issues, my November/December issue is here: <http://www.ka9q.net/AMSAT-ORBIT-4.pdf>

AMSAT was just lamenting the loss of Phase III-A due to launch failure. It must have been a shattering blow to all involved so early in the career of AMSAT. AMSAT as an organization and I were about the same age then; I was 14 and AMSAT was 11 !

Fast forward to 1989. I had my General class by then. A good friend, Dick Parker, KT1J was a bored Extra who had worked about everything there was to work on HF and was trying his hand at satellite. We would chat on the local 2 meter simplex frequency, and every so often he would excuse himself saying he had to go "work a pass". You could hear the cw beacon of what I later found out was the cw "robot" for the Russian satellite RS-10. I was hooked ! I had to try this myself! Somehow I scrounged up the money to buy Dick's retired Icom IC-211 for two meters and an Icom IC-451 for 70 cm, and by November of 1989, I had my first QSO logged on AO-13. It was with Howard, W7BI in Bellevue Washington. I suspect I may have made earlier QSOs but that is the earliest one I can find in what remains of my logs.

Sadly, Dick passed on not long after that due to cancer, but his tower,

antennas and Yaesu FT-726R did yeoman's work for several years here after I purchased them off his widow Ellen and in fact still use the tower today.

I made dozens if not hundreds of QSOs through AO-21 mobile in the early 1990s under my brand-new callsign WE1U as a Cell Site Technician for a small wireless communications company. I had 1 kW ERP portable on 70 cm on the uplink using the final out of an old Motorola UHF Micor and my Kenwood TH-78 dual-band HT driving a 13-element yagi on a camera tripod ! I shudder to think of what the RF Exposure folks would think of that setup now. But my real love was chasing DX on the Molniya orbit birds.

Fast forward again to January 2010. I'm on my second marriage, and have come full circle back to the house I was raised in, after my parents passed on in 1991 and 2002 respectively. In 2003, my wife and I purchased the house and property. I still operated satellite from time to time, albeit with very different gear from what I had in the 1990s. I had put up a pair of M2 (2MCP14 and 436CP30) antennas and SSB mast-mount preamps in the late 1990s or early 2000s when I put up the tower here. The Icom 271/471 twins had been sold and replaced with a Kenwood TS-2000X that I had purchased to work AO-40. I did get to work a few QSOs through it using a skeleton dish and K5GNA downconverter for the downlink before it became SK. I was a little bored with ham radio, and my 30th



anniversary in ham radio was only months away. I had heard that EME was possible with a single yagi and a hundred watts, and boy, I HAD both of those. I homebrewed up a soundblaster clone for my TS-2000 and downloaded a copy of WSJT. And I'll be darned if I didn't make my first EME QSO, with DX no less, on February 27th of 2010 with UA3PTW, Anatoli. I don't begin to say it was easy, but it was possible.

I won't go into the rest of the story here; I already wrote it up in the pages of the Journal back in the May/June 2011 issue. Suffice it to say, I was hooked, and here to stay. I've made a lot of mistakes along the way, and learned a lot, and hopefully I can share both in an informative and amusing way.

VY 73 de Bob W1ICW

w1icw at myfairpoint dot net



The **Proceedings of the AMSAT-NA 30th Symposium** and AMSAT-NA Annual Meeting, October 26-28 in Orlando, Florida are available in the on-line AMSAT Store.

Please visit the store at:
<http://store.amsat.org/catalog/>

The proceedings contains over 30 articles on subjects ranging from current satellite operations to updates on the Fox Project.

If you could not make the meeting, this is a great source of the latest information.

Price is \$25 + \$12 Shipping for USA.
Order your copy today!

AMSAT is the North American distributor of **SatPC32**, a tracking program designed for ham satellite applications. For Windows 95, 98, NT, ME, 2000, XP, Vista, Windows 7.

Version 12.8b is compatible with Windows 7 and features enhanced support for tuning multiple radios.

Version 12.8b features:

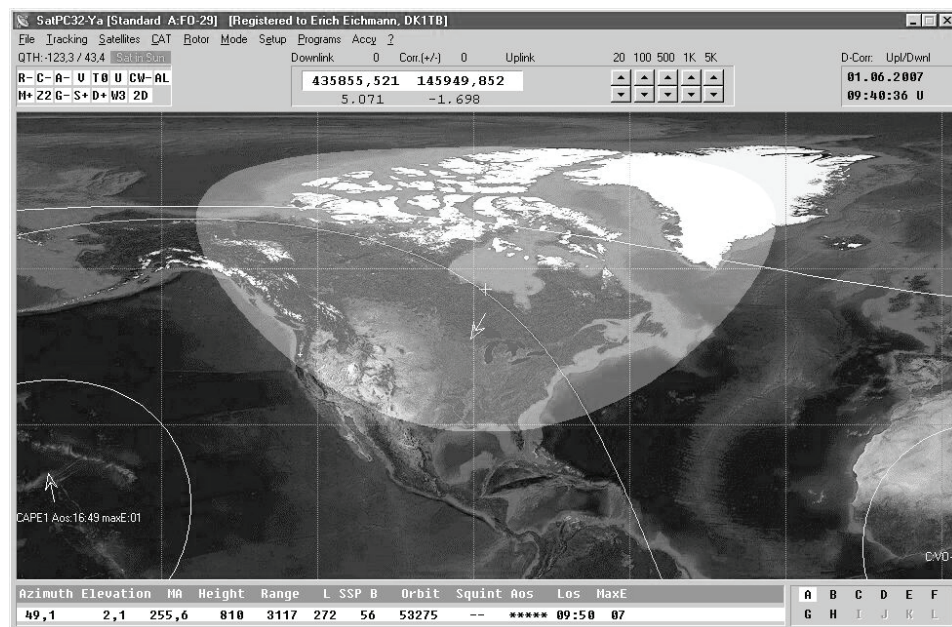
- SatPC32, SatPC32ISS, Wisat32 and SuM now support rotor control of the M2 RC-2800 rotor system.
- The CAT control functions of SatPC32, SatPC32ISS and Wisat32 have been expanded. The programs now provide CAT control of the new Icom transceiver IC-9100.
- The main windows of SatPC32 and SatPC32ISS have been slightly changed to make them clearer. With window size W3 the world map can be stretched (only SatPC32).
- The accuracy of the rotor positions can now be adjusted for the particular rotor controller. SatPC32 therefore can output the rotor positions with 0, 1 or 2 decimals. Corrections of the antenna positions can automatically be saved. In previous versions that had to be done manually.
- The tool 'DataBackup' has been added. The tool allows users to save the SatPC32 program data via mouse click and to restore them if necessary. After the program has been configured for the user's equipment the settings should be saved with 'DataBackup'. If problems occur later, the program can easily restore the working configuration.
- The rotor interfaces IF-100, FODTrack, RifPC and KCT require the kernel driver IOPort.SYS to be installed. Since it is a 32-bit driver it will not work on 64-bit Windows systems. On such systems the driver can cause error messages. To prevent such messages the driver can now optionally be deactivated.
- SuM now outputs a DDE string with azimuth and elevation, that can be evaluated by client programs. Some demo files show how to program and configure the client.

Minimum Donation is \$45 for AMSAT members, \$50 for non-members, on CD-ROM. A demo version may be downloaded from <http://www.dk1tb.de/indexeng.htm>

A registration password for the demo version may be obtained for a minimum donation of \$40 for members and \$45 for non-members.

Order by calling 1-888-322-6728.

The author DK1TB donated SatPC32 to AMSAT. All proceeds support AMSAT.



by Patrick Stoddard WD9EWK/
VA7EWK - wd9ewk@amsat.org

For a very long time, I have wanted to visit Australia. This country has always interested me ever since I was in grade school. I have been a fan of Australian rules football since I first saw it on ESPN in the mid-1980s. A foreign-exchange student from Melbourne (who was also a rabid fan of Australian rules football) attended my high school during my senior year, and we kept in contact after she returned home. And, of course, the 2000 Summer Olympics in Sydney showed a little slice of Australia that only added to my interest. Add in my satellite operating, and taking my portable all-mode satellite station wherever I've gone since early 2010, and an Australian trip finally became reality in May 2011.

Before I left, I posted to the AMSAT-VK Yahoo! group¹ about my planned trip, and asking questions of that helpful group. I also sent e-mails to several Australian satellite hams. I knew that the Australian Communications and Media Authority² (ACMA, Australia's amateur licensing authority) issued a "class license"³ in 2008 that allows foreign amateurs from many countries on short visits to Australia operating privileges without first applying for a temporary Australian license and call sign. This took care of the radio licensing formalities, and my call sign would be VK/WD9EWK. I read through information from the ACMA and the Wireless Institute of Australia⁴, the national organization for amateur radio in Australia, which was helpful for repeater listings covering Melbourne and Sydney – the two cities I would visit.

My portable all-mode satellite station for this trip is the same station that has gone with me on my trips around

North America. I brought a pair of Yaesu FT-817NDs, a Kenwood TH-F6A HT with its all-mode receiver, a Kenwood TH-D72A HT, an Elk handheld 2m/70cm log periodic, and a 2m/70cm magnet-mount mobile antenna. The radios and most accessories travel in an old laptop bag that I carry. The antennas went in a suitcase that gets checked for air travel. As I drove around Australia, the TH-D72A and magnet-mount antenna would be used on the Australian APRS network.

I left for Australia on the Thursday afternoon before the 2011 Dayton Hamvention (19 May). From Phoenix, this would be almost a full day for travel – a one-hour flight to Los Angeles, seven hours between flights at LAX, then 15 hours on a Qantas A380 double-decker "superjumbo" to Melbourne. Even in the economy section, the A380 was very comfortable for the long flight. Since the LAX-Melbourne flight crossed the International Date Line, I "lost" a day (Friday, 20 May). I arrived in Melbourne on Saturday (21 May) morning. After over an hour going through the arrival formalities at Melbourne Airport, I was driving toward the center of Melbourne in a right-hand-drive Toyota Corolla, my first time driving a right-hand-drive vehicle on the left side of the road. I arrived too early to check into my hotel room next to the huge Melbourne Cricket Ground stadium, so I first went downtown. I walked around the heart of Melbourne, and then drove around the city before checking into my hotel room and relaxing for the rest of the day. I also looked at the satellite passes for the coming week, using the free Satellite Tracker app written by Australian ham Susan Mackay VK3ANZ on my iPod Touch. I would have SO-50 and VO-52 passes in close proximity every morning, with FO-29 and AO-7 passes also available. These

would be the four satellites I would work during this trip.

After spending my first night in Melbourne, I wanted to do two things the next morning (Sunday, 22 May) – get on the radio, and attend an Australian Football League⁵ match. The football match did not start until 1pm, so I took the morning to find a good place where I could work the satellites. The center of Melbourne, along the Yarra River and Port Phillip Bay, is surrounded by higher land. I drove east of the city center and found Doncaster Reserve – a city park in an east-side suburb that looks over the center of Melbourne. I parked next to an oval field used for Australian rules football, and set up my station on the roof of my rental car. From this park, I worked VO-52 and SO-50 for the first time.

With the smaller satellite ham population in this part of the world, I came to realize that satellite passes were always round-table conversations. My first VO-52 pass made this clear right away. I heard Mal VK2MAL near Sydney and Graham VK2AYE near the Pacific coast east of the Australian capital, Canberra. I announced my call, and Mal quickly welcomed me to Australia. The three of us had a nice chat for the remainder of this pass. About 20 minutes later, SO-50 passed by. I had a chat with Judy VK2TJU in Sydney, who was the only other station for this pass. With these QSOs in the log, I packed up the radio gear and went to the football match at Etihad Stadium, a large stadium with a retractable roof in the Docklands area west of downtown Melbourne.

My favorite Australian football club, the Collingwood Football Club⁶ – also known as the Magpies – was playing the Adelaide Crows from South Australia at Etihad



Stadium. Skies were cloudy over Melbourne, so the stadium roof was closed. While waiting outside the stadium, I talked with some Magpie fans – all of whom were curious how an American becomes a fan of Australian rules football. A couple of them were in the Magpies' cheer squad – a group that sits in one end of the stadium, complete with pom-poms and signs supporting their club. I was able to walk down to the edge of the field, and then onto the field and into the Magpies' locker room under the stadium. After visiting the locker room, I was "drafted" to help hold up a large banner the Magpie players would run through before the match. I was having so much fun, and the match had not yet begun. The Magpies would end up winning the match, and I was able to go back into the locker room after the match. I took lots of pictures, and had some pictures taken with several Magpie players and their head coach. A couple of days after this match, I attended the Magpies' Tuesday morning workout session at their headquarters in the Olympic Park district, the site of the 1956 Summer Olympics southeast of the Melbourne city center.

Over the next couple of days, I did more sightseeing and radio operating. I visited the headquarters of the Wireless Institute of Australia, Australia's national amateur radio organization, and a nearby ham radio store in the eastern suburb of Bayswater. I did not hear anyone on VO-52 during the weekday morning passes I worked, but talked with Mal or Judy on the SO-50 passes while I was in Melbourne. I wanted to work AO-7, and it was in mode B on Tuesday (24 May) afternoon. I parked at another city park west of downtown Melbourne and set up my station. After a couple of CQ calls, Roy VK4ZQ near Brisbane called me. We chatted for several minutes,



WD9EWK Satellite Gear Ready for Travel



VK/WD9EWK Station at Doncaster Reserve



WD9EWK With Magpie Player.

when Mal VK2MAL joined in for the remainder of the pass. During the pass, it started raining. I covered my radios to keep them from getting soaked. Since there was no thunder or lightning, I was able to finish the pass and have a great chat with Roy and Mal.

Before I left for Australia, I sent Tony VK3JED e-mails about my planned trip. Since I had corresponded with Tony via e-mail for almost a decade, I wanted to meet him in person. He mentioned there was a presentation being given in his city, Bendigo, about the planned Square Kilometre Array radio telescope project⁷. I made plans to drive there - a 2-hour drive northwest of Melbourne - on Wednesday (25 May) morning. After talking with Tony on a 70cm repeater as I approached Bendigo, I met him at a café next to Lake Weeroona near the city center. Later that night, I met him at the radio telescope presentation in Bendigo's Discovery Science & Technology Centre. Even though I only planned to spend one day in Bendigo, this was an enjoyable day before the next part of my trip.

Early Thursday (26 May) morning, I drove back to Melbourne Airport to catch my 90-minute flight up to Sydney. Thanks to weather conditions, the flight into Sydney Airport approached from the north, passing by the Sydney Harbour Bridge and the Sydney Opera House in the city center. I was able to take pictures as the flight passed by those landmarks, even as the plane landed and drove to the terminal. After the flight, I drove to my hotel in the city center, and spent the rest of the day walking around that area and nearby Darling Harbour. Friday (27 May) was spent with my high-school friend, getting a tour of the city for the entire day. This left me one more day in Sydney, before I returned to Melbourne for my flight back to Los

Angeles.

On Saturday (28 May) morning, I checked out of the hotel, loaded up my rental car - an Australian-made 2011 Ford Falcon - and spent the day sightseeing. I knew when SO-50 and VO-52 would be passing by that morning, and made sure I was in a good spot for those passes. I drove west of the Sydney city center to Sydney Olympic Park, the site of the 2000 Summer Olympics. I parked across the street from the Olympic stadium - called Stadium Australia during the Olympics, now called ANZ Stadium, used for a wide variety of sporting events and concerts. I set my gear up on the roof of the car, and worked both passes. I had another nice chat with Judy VK2TJU and Mal VK2MAL from their homes in the Sydney area on the SO-50 pass, but worked nobody on the following VO-52 pass. After those passes and a quick breakfast, I drove out to the Blue Mountains west of Sydney for more sightseeing and lunch before driving back to the city for my flight to Melbourne in the evening.

On my way back to Sydney Airport in the mid-afternoon, I stopped to try the one satellite I had yet to work in Australia - FO-29. I found an open field near an exit off the M7 motorway west of Sydney, and set up my gear for the last pass I would work as VK/WD9EWK on this trip. I heard a conversation already in progress - Mal VK2MAL in Sydney (I discovered later Mal lives a few km east of where I stopped!) was talking with Brett VK1MAG in Canberra. I joined in, and the three of us had a nice chat until the end of the pass. After the pass, I packed my gear, and drove to Manly, one of Sydney's famous beaches. After spending some time walking around and taking some pictures, I drove to the airport. After the 90-minute flight back to

Melbourne, I checked into a hotel at Melbourne Airport for the night and my flight home the next morning.

Sunday (29 May) would feel like a very long day. I walked from the hotel back into the airport, where I checked in for my flight and went through the Customs and security checkpoints on the way to the gate. The flight to Los Angeles was on another Qantas A380 superjumbo, which would take approximately 14 hours - including gaining the day I "lost" on the way to Australia. It took almost two hours to clear the US Customs and immigration checks in the international terminal, and then I walked to the terminal for my 45-minute flight back to Phoenix. About 22 hours after leaving Melbourne, I made it home - and all of this happened in one "day".

Even though I did not work the satellites as often as I have done on other trips, I was happy with the chances I had in Australia. I only worked 5 different stations in New South Wales, Queensland, and the Australian capital city Canberra via satellite as VK/WD9EWK. Unfortunately, I did not hear stations in other parts of Australia during this week, nor did I hear anyone from New Zealand. Maybe next time. I made some videos combining the audio from a few of the satellite passes and photos of my satellite gear and other pictures of Melbourne and Sydney, and posted them on YouTube⁸ along with another video from one of my crossings of the Sydney Harbour Bridge.

Thanks to the friendly Australian hams I worked on the satellite passes. I may not have worked as many stations as I had on trips around North America, but these passes were just as fun to work. Thanks to Mal Brooks VK3FDSL and the staff of the Wireless Institute of Australia for

their hospitality during my visit to the WIA headquarters. And thanks to the Collingwood Football Club, for their hospitality at the football match and later at their training facility. I could not have planned that any better! It took a long time for me to make my first trip to Australia. This won't be my last trip!

Notes

1. AMSAT-VK Yahoo! group:
<http://groups.yahoo.com/group/amsatvk/>
2. Australian Communications and Media Authority: <http://www.acma.gov.au/>
3. Text of Australian "class license" for foreign amateurs visiting Australia: <http://www.comlaw.gov.au/Details/F2010C00893>
4. Wireless Institute of Australia: <http://www.wia.org.au/>
5. Australian Football League: <http://www.afl.com.au/>
6. Collingwood Football Club: <http://www.collingwoodfc.com.au/>
7. Square Kilometre Array radio telescope project: <http://www.skatelescope.org/>
8. WD9EWK/VA7EWK YouTube videos: <http://www.youtube.com/va7ewk> 🌐



Sydney Harbour Bridge and Opera House



VK/WD9EWK Station for FO29 pass



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New 2012 color AMSAT Fox Decal, 5" x 3". Adhesive back that will stick to your laptop or other items.



VK/WD9EWK QSL Cards



AMSAT's Forty-Three Years in Space

by **Bill Tynan, W3XO, AMSAT LM-10**

This, and forthcoming AMSAT Journal articles chronicling AMSAT's history, are based on a book prepared for the 40th Anniversary Annual Meeting and Space Symposium held in Baltimore in October, 2009. The writer assembled the information contained in that publication with the invaluable assistance of Dick Daniels, W4PUJ, Keith Baker, KB1SF/ VA3KSF, Bob Bruninga, WB4APR, Lou Mc Fadin, W5DID, Ray Soifer, W2RS and Bill Hook, W3QBC.

In the Beginning

It all began in early January, 1969 when George Jacobs, W3ASK, then the writer of CQ's propagation column and professionally associated with the Voice of America; spoke at a meeting of the Communications Satellite Corp. (COMSAT) Radio Club. In his talk on Project OSCAR, George noted that the West Coast group, that had pioneered Amateur Radio satellites, had not been able to orbit any new spacecraft for about five years. He also observed that the Washington area included many industrial, university and government laboratories employing hams, who should possess the technical capability to construct spacecraft. Therefore, he urged that a Washington-based organization be established to carry on the fine work begun by Project OSCAR.

A young Ph.D. in the audience, Perry Klein, K3JTE (now W3PK), was so inspired by George's talk and its challenge, that he resolved to take action. And take action, he did.

Wasting no time, Perry called a

meeting at his apartment in Southwest DC. To that meeting, he invited representatives from various amateur radio clubs associated with DC-area organizations and government agencies. Included was the club at the Johns Hopkins Applied Physics Laboratory (JHU/APL) where Jim Puglese, W3CBJ (now K9CQ) and this writer were employed. Answering Perry's call, Jim and I journeyed, one cold winter evening, from our homes in the Maryland suburbs down to Southwest Washington - having no idea what we were getting ourselves into.

Attending also, were, George Kinal, K2MBU (now W3HPE), who worked for Communications and Systems Inc. and Cap Petry, W3AWN, (SK) from the Aeronautical Radio Incorporated (ARINC) Radio Club.

Perry's enthusiastic recounting of George Jacob's challenge inspired everyone to the point that they immediately agreed to form the organization which is now known as the Radio Amateur Satellite Corporation, or AMSAT.

Getting Organized

It wasn't long before more came aboard; among them, Jan King, K8VTR (now W3GEY and VK4GEY), and Harry Helfrich, W3DWF (later W3ZM) (SK), both of the radio club at the Goddard Space Flight Center, Dick Daniels, WA4DGU (later W4PUJ), of NASA Headquarters, (a recent silent key), Ray Soifer, K2QBW (now W2RS), then serving with the U.S. Maritime Administration, Bob Carpenter, W3OTC, of the National Bureau of Standards, and Dick Mostow, W3YAV, publisher of Forecast FM

magazine. All pitched in to draft a set of bylaws and an application for a charter from the D.C. Government. By March 3, the Radio Amateur Satellite Corporation was officially incorporated in the District of Columbia as a non-profit educational scientific organization.

The original bylaws, which display AMSAT's purpose and objectives, are shown in the sidebar.

Thus from George Jacobs' original talk before the COMSAT Amateur Radio Club, to incorporation, less than two months elapsed.

Obviously, all involved were enthusiastic to get started.

AMSAT's original concept was that it would be made up of Member Societies, or clubs, and members of these groups would participate through these Member Societies. That changed almost immediately as many individuals, not associated with any particular club, clamored to join.

AMSAT's interim Board of Directors was composed of the five who signed the Articles of Incorporation: Jim Puglise, George Kinal, Cap Petry, Jan King and Perry Klein. In June, two more were added to this interim Board: Capt Charles (Chuck) Dorian, W3JPT (SK), of the U.S. Coast Guard and the writer. These same people were elected by the members attending the first AMSAT Annual Meeting held at the Goddard Space Flight Center Employee's Recreation Center the following November. This Board reaffirmed Perry as President, Jan as Executive Vice President, George Kinal Vice President for Engineering, Cap Petry as Vice President for Operations and Harry



Article II — "Purposes and Objectives"

Section 1

The purposes and objectives of the Radio Amateur Satellite Corporation are:

- A. To provide satellites that can be used for amateur radio communication and experimentation by suitably equipped amateur radio stations throughout the world on a non-discriminatory basis.
- B. To encourage development of skills and the advancement of specialized knowledge in the art and practice of amateur radio communications and space science.
- C. To foster international goodwill and cooperation through joint experimentation and study, and through the wide participation in these activities on a noncommercial basis by radio amateurs of the world.
- D. To facilitate communications by means of amateur satellites in times of emergency.
- E. To encourage the more effective and expanded use of the higher frequency amateur bands.
- F. To disseminate scientific, technical and operational information derived from such communications and experimentation, and to encourage publication of such information in treatises, theses, trade publications, technical journals or other public media.

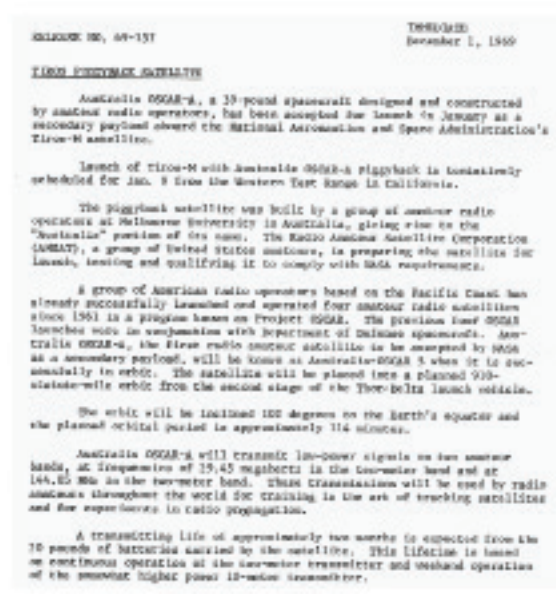
Copy of AMSAT's bylaws showing
"Purpose and Objectives" (above)



Two early AMSAT supporters, Senator Barry Goldwater, K7UGA (left) & Vic Clark, W4KFC.



Lance Ginner, K6GSJ of Project OSCAR with OSCAR 1



A copy of the announcement of acceptance of Austrailus OSCAR A for launch. From AMSAT Newsletter Vol. 1 No. 3 December, 1969 (left)



Helfrich as Treasurer. The original bylaws called for board nominations by one or more AMSAT Member Societies. This provision was later changed to also allow nominations by any five individual members, as well as by Member Societies.

Telling our Story

How best to inform the amateur community of the new organization and its intention to provide the hobby with satellites? QST was obviously the best vehicle in which to make such an announcement. So Perry and I set out to write an article for that publication.

When our first draft was completed, I showed it to my friend Vic Clark, W4KFC (SK), then ARRL Roanoke Division Director and a fellow Potomac Valley Radio Club member. (Vic later became ARRL President.) He thought the piece needed a little more “pizzazz,” as he put it - and offered a few specific suggestions. Taking his good advice, a few paragraphs were added and the article announcing the birth of AMSAT was submitted.¹

Various suggestions were received for a logo that would convey the new organization’s mission in an eye-catching manner, but, none of them seemed to be quite what all were looking for. So, Dick Mostow went to a graphic artist friend at Washington’s Channel 9 TV station who came up the now familiar globe and arrow design that marks AMSAT today.

Also, through Dick’s efforts, AMSAT was able to obtain the address it used for years: Post Office Box 27, Washington, DC 20044. Such

low-numbered boxes had long been difficult to come by in the Nation’s Capital.

Let’s get Technical

For AMSAT’s first endeavor, we fell into the trap so typical of Washington - generating paper rather than actually accomplishing something. What did we do? Why, of course, we set up study groups to research various aspects of spacecraft design and submit reports. Assignments included spacecraft structures, thermal considerations, batteries and solar cells, gravity gradient stabilization and nuclear isotope power systems.

An interesting aspect of these assignments was that none involved anything having to do with computers. Apparently, none of us early AMSAT members dreamed of using computers in satellites. Possibly, if Tom Clark, WA3LND, (later W3IWI, now K3IO), had been involved at the time, the major role computers would play in spacecraft would have been recognized.

I was assigned the task of reporting on nuclear isotope power systems and gravity gradient stabilization, not because I knew anything about these subjects, but because I worked at JHU/APL that had been active in building satellites using these technologies. Let me make clear that I did not work in the Lab’s Space Department, but in another section involved in developing U.S. Navy weapons systems.

At a subsequent meeting called for presentation of the reports, George Jacobs stepped in to put the group on the right course. Admonishing us for behaving in typical Washington

bureaucratic fashion, George mentioned the existence of an amateur satellite that had been built at Melbourne University in Australia and sent to Project OSCAR several years before, in hopes for a launch. Since then, he said, it had been in the custody of Lance Ginner, K6GSJ. Why should not AMSAT’s first project be to prepare this spacecraft for launch? Everyone agreed George was right. Amateur Radio needed a new satellite soon, not a stack of visionary reports on what might be - years in the future.

So, thanks again to George Jacobs, our young organization was off and running - this time, in the right direction.

Following George’s suggestion, it was decided that AMSAT’s first project would be to obtain a launch for the Australian satellite.

Negotiations were begun and agreements reached with both Project OSCAR and the students and faculty members at Melbourne University for AMSAT to obtain their satellite and prepare it for launch. Jan King was given the responsibility for the technical work necessary to get the spacecraft ready.

In view of the key role Project OSCAR had played in getting Amateur Radio started in space, it had earlier been agreed that all AMSAT satellites would bear the name OSCAR. This policy would begin with the Australian spacecraft. Thus, the bird would be known as Australis OSCAR A prior to launch and Australis OSCAR 5, or AO-5, once in orbit.

Thanks to the dedicated work of Jan



and his team, Australis OSCAR A was ready for launch by the end of the year. Jan and Harry Helfrich, were able to arrange a ride for it as a secondary payload on a Delta vehicle scheduled to launch a weather satellite.

AO-5 roared into orbit in January, 1970, carrying beacons on 2 meters and 10 meters. In addition to getting Amateur Radio back into space, this satellite had two principal objectives. The 10 meter beacon was to prove the utility of that band for space use, and the command function would furnish the first demonstration of ground command of an Amateur Radio satellite.

Bill Dunkerley, WA2INB, then an ARRL Assistant Secretary and later QST's Managing Editor, arranged for the Talcott Mountain Science Center in Connecticut, to set up the necessary equipment to successfully command AO-5.

The ability to command amateur satellites would become increasingly important in later years as AMSAT, and other like-minded organizations in other countries, endeavored to convince their governments and other launch authorities that amateurs could control their spacecraft. Permission for launches would often hinge on being able to furnish such assurance.

References:

1. AMSAT, The Radio Amateur Satellite Corporation QST June, 1969 Page 54; Perry Klein, K3JTE and William A. Tynan, W3KMOV

Three basic joys of a QSO by George Carr, WA5KBH

Having been a ham since age 15 - that translates into since 1964-I have enjoyed many, many QSO's. First joy: The QSO, also translated into the contact. The second enjoyment is the arrival of the QSL card. The next level of pleasure, particularly if you have made many contacts - and perhaps especially a good regchew or two - with the other operator is the third joy: the eyeball QSO.

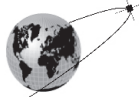
Here is a picture of a recent exchange of QSL cards and the eyeball QSO combined. I have no doubt that most of the AMSAT members have had the pleasure of working Jim Clary, ND9M, on the hamsats from several of the land and water grids. And perhaps a few of us have been fortunate enough to snag a QSO with Jim on the HF bands, as VQ9JC from Diego Garcia.

When not at work as a Radio Electronics Officer (REO) in the Merchant Marine, Jim and his wife Cori, travel around the US of A, handing out grids on the hamsats or counties on HF, especially in the CW band. ☎



The exchange of qsl cards between Jim (ND9N/VQ9JC) and George (WA5KBH) is witnessed by Cori (KK4CGA) and Joan (ex-WN0LDY), after the four enjoyed a very nice QSO over coffee in Lake Charles, Louisiana (EM30).





The efforts to secure scientific and education payloads as the basis for securing launch opportunities for AMSAT-designed spacecraft is based in part upon AMSAT's Articles of Incorporation which defines two of AMSAT's purposes as "the development and providing of satellite technology" as well as "encouraging the development of skills and advancement of specialized knowledge in the art and practice of amateur radio communications and space science." Note the inclusion of "space science" as criteria for AMSAT's purpose.

AMSAT's Mission Statement approved by the AMSAT Board of Directors in 2004 states,

"AMSAT is a non-profit volunteer organization which designs, builds, and operates experimental satellites and promotes space education. We work in partnership with government, industry, educational institutions and fellow amateur radio societies. We encourage technical and scientific innovation and promote the training and development of skilled satellite and ground system designers and operators."

Our focus on education outreach is based upon establishing partnerships with various organizations promoting space education and space science. Likewise, the Mission Statement also reflects the focus we've placed on Amateur Radio on the International Space Station (ARISS) and our partnership with international partners as well as the ARRL and NASA Education.

While AMSAT has been traditionally viewed as a builder of amateur radio satellites, we recognize now that it is "space education" that is the key to securing future launch opportunities as well as creating an environment for keeping amateur radio in space.

ARISS

I am pleased to note the reappointment of Frank Bauer, KA3HDO as AMSAT's VP-Human Space Flight Programs. Frank held this position for many years, but resigned in March 2009 due to work commitments at NASA. Frank retired from NASA in September 2011 and after a one-year "grace period," he may once again interact with NASA and international space agency

personnel on behalf of AMSAT and amateur radio. His appointment means he has rejoined the AMSAT leadership team, once again focusing on a program that is critical to amateur radio's presence in space.

Since Frank last served as VP-Human Space Flight Projects, a number of changes have taken place within the ARISS program. The school selection process has been altered considerably to more closely align with existing NASA processes for selecting education-based proposals that are used in other programs.

Further, schools that apply for a contact may not be aware of the specific amateur radio requirements prior to selection. This means that our ARISS volunteers may be put in a position where they must find local amateurs or clubs willing to support the school as ground station operators after that school's selection. Consequently, the roles and responsibilities of our ARISS mentors have evolved. The number of schools selected also puts additional pressure on mentors, which in turns has expanded our need to find more mentors to support the process. During the 2012 Dayton Hamvention, AMSAT's VP-Educational Relations, Mark Hammond, N8MH gave two presentations at the ARRL "DIY" Stage outlining the need for more mentors. He outlined the roles and responsibilities of technical mentors and ground station operators.

Another major change over the past year that benefits ARISS is the appointment of Dr. Mark Hammond, N8MH as AMSAT's VP-Educational Relations, tasked with enhancing AMSAT's educational partnerships. Mark's appointment also recognizes that NASA's support for ARISS is predicated upon enhanced "education content" of amateur radio on the International Space Station (ARISS). Mark is part of an "Amateur Radio Education Partnership" that is looking at developing new programs that will utilize amateur radio assets on the ISS in support of STEM as justification for maintaining amateur radio on board the ISS. The Education Partnership consists of representatives from AMSAT and the ARRL along with a point of contact within the NASA JSC "Teaching from Space" office. The Education Partnership's focus is on creating educational content needed to support amateur radio on the ISS.

Clearly, the success of AMSAT's enhanced Human Spaceflight focus under Frank's leadership is dependent in part on the close collaboration between ARISS operations and hardware development with educational

outreach. Frank's professional experience, passion for ARISS, and demonstrated accomplishment in support of ARISS will bring significant enhancement to the ARISS program.

AMSAT Store

The AMSAT Store was reestablished in August after being offline since May due to security concerns. The new AMSAT Store resides in a different location, uses a different software suite, and uses PayPal Services to process payments through credit cards or PayPal itself. The loss of the store was not only a major inconvenience, but also a financial burden. The store had become a major venue for handling AMSAT transactions, including AMSAT memberships/renewals and purchases of hardware and miscellaneous items.

Thanks to the efforts of a number of individuals, including Gould Smith, WA4SXM and Joe Fitzgerald, KM1P plus Alan Biddle, WA4SCA and Bruce Paige, KK5DO who assisted our AMSAT Store implementation, the new store provides the same services as the old site. There are still some "tweaks" needed to make it easier for Martha and the AMSAT office to process orders, but from a user's perspective the "look and feel" should be easy to deal with. If you have comments about the AMSAT Store experience, please share them with us by sending an e-mail to Martha@amsat.org.

AMSAT Annual Meeting

Under AMSAT's Bylaws, an AMSAT General Membership Meeting is required annually. This year's meeting took place following the closing of the 30th AMSAT Space Symposium in Orlando, attended by those who were at the Symposium and made available through AMSAT's EchoLink connection. As part of the meeting agenda, I gave an "AMSAT Annual Report" presentation, outlining our accomplishments as an organization, addressing some of our concerns (such as our declining membership trend), as well as noting some of our goals for 2013. A copy of my presentation is currently available on the AMSAT website: http://www.amsat.org/amsat-new/images/fck_images/2012PresidentReportSlides%282%29

Please review this material and if you have questions or comments about AMSAT or the presentation, please don't hesitate to contact me (wd4asw@amsat.org).

Also available on the AMSAT website is a

continued on page 23 ...



On Friday, October 19, after some final testing and characterization checks completed at the facilities of ISIS BV in Delft, AMSAT-UK handed over the set of three PCBs that form the FUNcube-2 subsystem on the UKube-1 spacecraft to Clyde Space Ltd in Glasgow. Clyde Space are leading the development and assembly of this CubeSat project for the UK Space Agency.

The PCBs were taken to Glasgow in a Pelicase by Graham Shirville G3VZV who handed them to Steve Greenland Systems Engineer at Clyde Space.

FUNcube-2 on UKube-1 will provide a 435/145 MHz (U/V) linear transponder for amateur radio SSB/CW communications and telemetry for school students around the world.

The UKube-1 spacecraft is expected to be launched on a Soyuz-2 launcher from Baikonur in Kazakhstan in March 2013. UKube-1 is a demonstration CubeSat mission designed to provide a platform for up to three technology demonstrator payloads. In addition to these payloads the satellite will incorporate innovative attitude determination and control systems, deployable arrays, FPGA on board mission controllers.

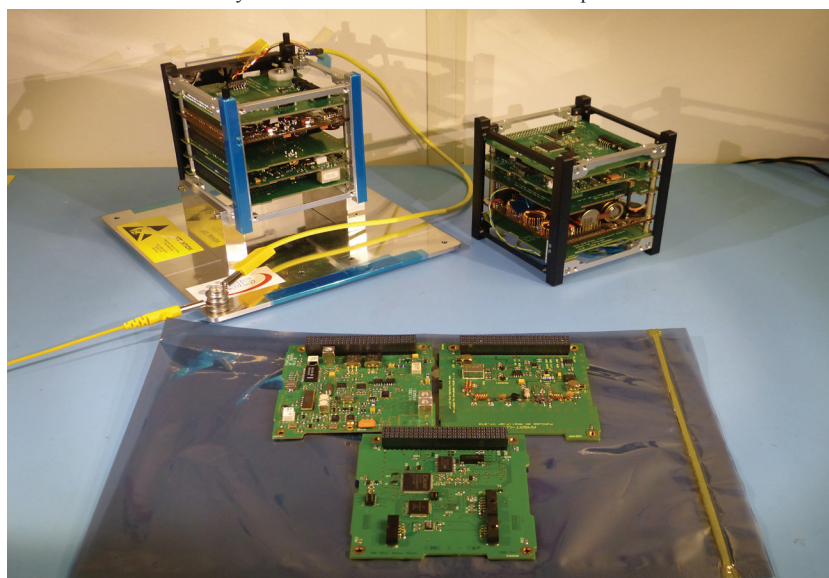
The communications systems include:

- A U/V transceiver from ISIS BV, using either 1k2 or 9k6 BPSK downlink on 145.840 MHz.
- A FUNcube compatible U/V transponder and telemetry transmitter (1k2 BPSK Telemetry downlink 145.915 MHz) provided by AMSAT-UK for educational outreach, amateur transponder operation and redundant telecommand.
- SSB/CW linear transponder uplink 435.080 - 435.060 MHz and downlink 145.930 - 145.950 MHz.
- A 1 watt S Band transmitter from Cape Peninsula University of Technology, Cape Town, for high data rate mission data downlinking using up to 1 Mbps QPSK or OQPSK modulation on 2401.0 MHz.
- myPocketQub 442 SuperSprite AU on UHF with 11mW output using spread spectrum with 100 kHz bandwidth between 437.425-437.525 MHz

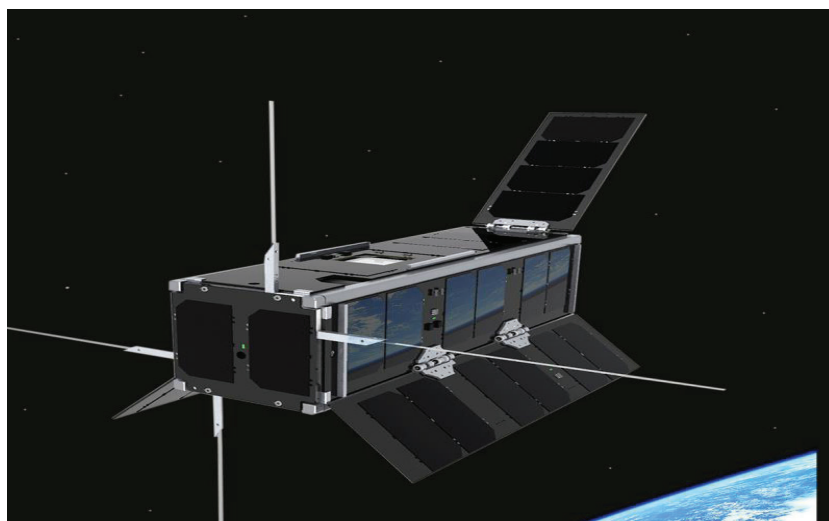
AMSAT-UK <http://www.amsat-uk.org/>



Steve Greenwood of Clyde Space receives the Pelicase containing the three FUNcube-2 boards. The three PCB's comprise: CCT Board – Command, control and telemetry, interfaces via I2C with the antenna deployment system and the main OBC (On-Board Computer). RF Board – Command receiver, telemetry transmitter and linear transponder of the FUNcube satellite educational payload also includes telemetry sensors. PA Board – 400 mW VHF amplifier and sensors.



Flight and Engineering Models of FUNcube-1 with the three FUNcube-2 boards



Artists impression of UKube-1 in orbit – Image credit Clyde Space





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Contact Martha at the AMSAT office 301-589-6062 to order.

The complete units will be built in groups, so get your orders in early. Units will be shipped as they become available.

NASA Offers Spot The Space Station Service Via Text or E-mail

WASHINGTON -- On the 12th anniversary of crews continuously living and working aboard the International Space Station, NASA announced a new service to help people see the orbiting laboratory when it passes overhead. "Spot the Station" will send an email or text message to those who sign up for the service a few hours before they will be able to see the space station.

"It's really remarkable to see the space station fly overhead and to realize humans built an orbital complex that can be spotted from Earth by almost anyone looking up at just the right moment," said William Gerstenmaier, NASA's associate administrator for human exploration and operations. "We're accomplishing science on the space station that is helping to improve life on Earth and paving the way for future exploration of deep space."

Minimum donations requested for various configurations:

- 1) Bare board - \$20 + S&H - no parts kits available
- 2) Populated board, serial interface - \$100 + S&H - no kit with USB unit, rotor cable and LCD available, we do have a parts list with recommended part numbers and sources.
- 3) Custom Ten-Tec Enclosure powder coat, silk-screened, drilled/punched - \$50 + S&H
- 4) Complete unit - board, USB output, rotor cable, LCD, enclosure - \$200 + S&H **our most popular

Documentation for the LVB Tracker can be found at: <http://www.LVBTracker.com>

Boards and complete units may be ordered from the AMSAT office at 301-589-6062 or from martha@amsat.org

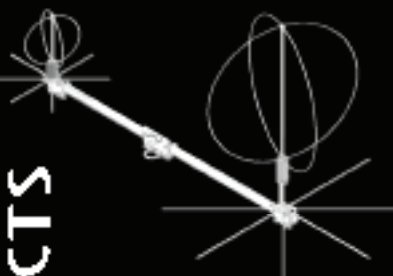
When the space station is visible -- typically at dawn and dusk -- it is the brightest object in the night sky, other than the moon. On a clear night, the station is visible as a fast moving point of light, similar in size and brightness to the planet Venus. "Spot the Station" users will have the options to receive alerts about morning, evening or both types of sightings.

The International Space Station's trajectory passes over more than 90 percent of Earth's population. The service is designed to only notify users of passes that are high enough in the sky to be easily visible over trees, buildings and other objects on the horizon. NASA's Johnson Space Center calculates the sighting information several times a week for more than 4,600 locations worldwide, all of which are available on "Spot the Station." To sign up for "Spot the Station," visit: <http://spotthestation.nasa.gov>





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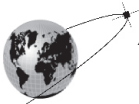


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video interview of me conducted by Gary Pearce, KN4AQ of Amateur Radio Video News that was conducted at the 2012 Shelby (NC) Hamfest on 1 SEP 12. This became Episode 19 of the "Ham Radio Now.tv" series. There is a link to that video on the AMSAT main page as well, which will take you to this site: http://arvideonews.com/hrn/HRN_Episode_0019.html

Between the "Ham Radio Now" interview and the AMSAT Annual Report that are available on the AMSAT website, the letter to the membership that was enclosed with the BoD election ballots back in June, and the materials being presented in this issue of AMSAT Journal, I hope that you will be fully informed on the state of AMSAT, the strategic direction we're taking and the outstanding work of our volunteers.

One of the more enjoyable aspects of AMSAT leadership is taking the opportunity to recognize the significant amount of time and talent of key volunteers who make a difference for AMSAT. As part of the Annual Meeting, each department head, such as Engineering, Membership Services, etc. read the names of those being recognized with over 70 individuals. Those individuals in attendance received their certificate and memento; those not in attendance will have their items mailed to them. We will publish the list of recipients and the wording of their certificates in a future issue of the AMSAT Journal as another way of highlighting the significant accomplishments of these individuals.

AMSAT Symposium

The 30th Annual Space Symposium that took place in Orlando, FL the weekend of 26 OCT 12 was a huge success attended by over 100 individuals. Along with excellent presentations, attendees heard an outstanding presentation by Dr. Samuel T. Dorrance, Professor of Physics and Space Sciences at Florida Institute of Technology (Melbourne, FL) and a former NASA Payload Specialist who flew on two STS missions (STS-35/Astro-1 and STS-67/Astro-2). He was a close friend and colleague of AMSAT member Ron Parise, WA4SIR (SK) who flew on the same Astro Missions. Sam's presentation included a slide presentation that included not only his own space experiences but also included Ron's participation as well.

Attendees also were afforded an opportunity to visit the Orlando Science Museum on Sunday and a tour of Kennedy Space Center (KSC) on Monday that included stops at the Vertical Assembly Building (VAB) and Launch Control Center (LCC) along with other NASA buildings. They also met the KSC Director, Bob Cabana at the VAB who talked about the changes taking place to prepare for NASA's new heavy-lift vehicle, Space Launch System (SLS). Needless-to-say, this tour was unique and provided a behind-the-scenes look at America's spaceport.

Many thanks to Symposium co-chairs Lou McFadin, W5DID and Dave Jordan, AA4KN for their leadership in making this Symposium so successful. My thanks also to Martha Saragovitz and Gould Smith, WA4SXM who did much of the behind the scenes preparation work and to Dan Schultz, N8FGV who served as Proceedings editor. If you didn't attend Symposium and would like a copy of the Proceedings of the 30th AMSAT Space Symposium and AMSAT-NA Annual Meeting, place your order NOW as there are not many copies left for distribution. The Proceedings is over 340 pages, much of the materials deal with the Fox-1 Program and are included in the publication in order to place these materials in the public domain so that we may discuss them openly while complying with ITAR.

Support for AMSAT

Many of us designate end-of-year donations to 501-(C)-(3) organizations. A donation letter to the membership will be sent in early December, asking for your support for Fox-1 and the significant work that AMSAT is doing to "keep amateur radio in space." Please consider making a donation to AMSAT. Your membership dues are used to provide operating funds to handle the day-to-day expenses of the organization; there are not enough AMSAT memberships dues to provide sufficient funds to help cover projects as well. Consequently, we are dependent upon additional donations to provide funding for AMSAT's satellite projects. When you receive our donation request, please be generous and help provide the resources needed to complete these projects.

Barry A. Baines, WD4ASW
President ☸

ARISS Contact Wins PR Award

As Clint Bradford, K6LCS of Jurupa Valley said, "It was 13 months of planning for 10 minutes of conversation, but, oh!, what a conversation!"

"'LIVE! from outer space!'", was the special event on that earned an award for Karen and Clint Bradford in annual competition by the Public Relations Society of America. The event was planned for the 120 students of Flabob Airport Preparatory Academy and more than 80 parents, community leaders, media representatives and interested persons.

"When we looked around the hangar at the conclusion of the contact, hearing the students' whoops of happiness, we saw more than a few adults wiping at their eyes, us included," Karen said. "We felt intensely rewarded to think how our students may feel throughout their lives when they look up in the sky and remember the thrilling day when Flight Engineer Don Pettit answered their questions."

The mission of Flabob Airport Preparatory Academy is to use aviation as a tool to motivate students to achieve their personal, academic, and career goals. ☸



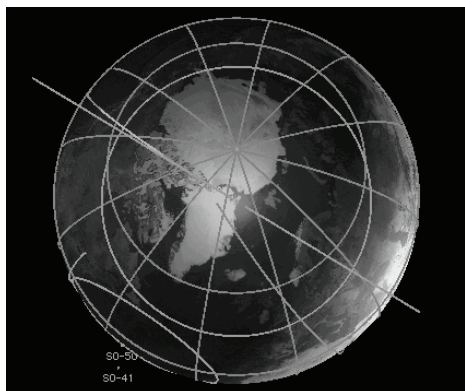
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2012 AMSAT Fox Tee shirt. Sand colored tee with Fox logo and CubeSat image across the front.



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Help Wanted

AMSAT needs qualified volunteers for a number of positions!

If you want to be a part of the solution in making AMSAT operational and work toward designing, building and finding a launch, WE NEED YOU!

No pay for 5+ hours per week, but a great deal of satisfaction in knowing you are helping make something happen.

We need people with these skills:

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- Software engineering
- Hardware engineering
- PC based software design
- Web design and maintenance
- Project management
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- Hardware testing
- Software testing
- Hardware prototyping
- Specific area Web site information maintenance
- Video recording, digital conversion and editing
- Write technical or instructional material
- Educational activities
- Promoting AMSAT as an Area Coordinator



and any other area you think you think you can make a difference.

We often have people volunteer, but many don't deliver on their promises. So, pick an area that you think needs improvement and explain what you will do to make it better. Then do something to show that you can follow through.

Send your suggestions, actions plans and a description of why you are capable of doing this task to Gould Smith, WA4SXM, wa4sxm@amsat.org

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Minimum donation: \$5



ARISS Contact at PACIFICON 2012

By E. Michael McCardel, KC8YLD

I recently had a radio adventure of a lifetime. As some of you know I traveled to Santa Clara to represent AMSAT's Educational Outreach at PACIFICON 2012 and the ARRL National Convention. Then two weeks later I ventured onto Orlando where I was opened the 30th AMSAT Space Conference with my presentation AMSAT @ PACIFICON 2012 and AMSAT's Educational Outreach.

This adventure began a year ago but I want to concentrate on the events as they unfolded at PACIFICON which was also the ARRL National Convention this year.

It takes a village to put on an ARISS contact. And, as mentioned, we had been working on this for a year. As the date drew closer all and activity seemed to compress. We found out Astronaut Lee Morin would be present at PACIFICON and would be available to witness the contact and to talk to the kids afterwards. We learned our primary ISS contact would be Aki Hoshide KE5DNI and the secondary contact Suni Williams KD5PLB. We made our contact with Aki. We now knew we were going to have to conduct the contact by telebridge, so we had to work out a system for using the hotel's PA system. Last minute paper work in the form release forms, press releases, and the 24 hour "we're ready" email to NASA confirming contact frequency and that our systems were in place, including a call back number. Just as Joe was answering the last question on the 24 hour email notice his computer rebooted, because of a Microsoft update, and it didn't send. We were within minutes of missing this deadline and possibly the contact. Fortunately Joe had had the foresight to forward all the



Thumbs up after the successful ARISS contact at PACIFICON 2012



EMike, KC8YLD making the call to get the ARISS telebridge connection



Joe Spier, K6WAO helping Ben ask his question.

correspondence to me and others on the EDU team. Hence, I was able to pull up the email template and complete it on my iPhone.

The next morning the Sedona room at PACIFICON was very active. We were demonstrating our ground station to the students, Mark and AMSAT President Barry Baines WD4ASW gave forum presentations. We had our run through with the kids, did sound checks etc. I had two simple tasks. First, make sure the kids had their questions and were lined up and ready to go. Second, make a conference call to Australia and Italy for the telebridge. Tony Hutchison VK5ZAI from Australia was our telebridge moderator and Claudio Ariotti IK1SLD from Italy was our Control Station as the ISS would pass over Europe.

I had the kids all lined up in their seats, in order, and ready to go. At 25 minutes before the scheduled contact I moved to the back of the room to the PA set-up picked up the white '80s era phone with the touch pad in the receiver and made my call. I soon heard Tony and Claudio chatting and announce myself, "This is PACIFICON, EMike KC8YLD here." Tony introduced himself and so did Claudio. It was then I noticed that 1. Nothing was coming over the PA and Tony and Claudio could only hear me but not the mic we were using for the contact. 2. This was not the phone we used in the dress rehearsal. My heart sank. A couple of our support team jumped in and began playing with the system. In a bit of a panic I suggested we not touch anything until the hotel tech arrived, although he was supposed to be right there. Joe coolly left the room and sought out the hotel tech. We're now 15 minutes from contact and the tech showed, much relief. Then the Tech says, "Hang-up" three of our the team say all at once "NO!"

The tech looks at me. I said "It's your system I have to trust you but we cannot lose this call." He smiled and answered, "Go ahead and hang up." With my heart in my throat I did as he said and suddenly, to everyone's relief, Tony's voice came in over the PA. The first phone was set up to call and everything was connected. The hotel tech was worried, rightfully so, about potential feedback and switched to another phone and switch, that activated as we hung up the receiver. He had just forgotten to tell anyone else.

Tony went into his spiel as moderator. He then turned to it back over to the venue where the PACIFICON ARISS contact, and AMSAT EDU team member Joe Spier had a chance to introduce himself describing what was happening at PACIFICON and bringing everyone's attention to the tracking software being displayed on two huge screens in the room. Everyone began to anxiously watch as the ISS projected footprint approached Italy from the Southeast. "Back to you Tony." Tony then introduced Claudio who described his station and what his part in the contact would entail as control station for the contact. Lastly he reminded the students to say over after their question. Then right on queue Claudio announced "I am going to call the International Space Station now." "OR4ISS this is IK1SLD for our scheduled student contact." STATIC-- Joe K6WAO the local ARISS contact frowned but looked confident. "OR4ISS this is IK1SLD for our scheduled student contact." More STATIC. Joe looks less confident. Odd to see this battle tested veteran look a little shaken. Again, OR4ISS this is IK1SLD for our scheduled student contact. Do you Copy?" "IK1SLD this is OR4ISS, Aki, I hear you loud and clear, Welcome aboard the International Space Station."

Everyone is smiling. Back at my post I have the kids lined up. Mary the first in line is on her spot. Joe: "This is Joe K6WAO, Welcome to PACIFICON."

All sixteen student were able to ask their questions and get answers:

Mary (9) : *What is the space weather forecast for the ISS today?*

Emily, KJ7BUF (19) : *How come there is not a section of the ISS that spins and provides artificial gravity to help the astronauts stay healthy, and have a somewhat normal existence – like in the movies?*

Katie, K7KTI (12) : *How can amateur radio be improved on the ISS?*

Devin (11) : *How do you sleep in space? Do you have beds?*

Maxton (8) : *"Do you ever get to talk to your family from space? If so, how?"*

Olivia (9) : *Can you see Venus, Mars, Jupiter or Saturn from where you are in space?*

Noah (5) : *How do you get from the space shuttle into the Space Station, and how do you get from the Space Station into the space shuttle?*

Annika (10) : *Of all your everyday things to do at home, what is the hardest to do in space?*

Andres (11) : *How does the lack of gravity effect your muscular structure in space?*

Cameron : *How did your face handle take off? Did it flap in the wind?*

Niccolo (8) : *What is the most memorable view of Earth you have seen from space?*

Aliya (9) : *How long can someone live on the space station?*

Emily (12) : *How is being in space different than you thought it would be?*

Ben (8) : *What are the 3 most important things for someone to do or learn before they apply to be an astronaut?*

Liam (6) : *How far away are you and how long will it take you to get back home?*

Shaylin (5) : *Can you and do you eat ice cream in outer space?*

We even had time for visiting astronaut Lee Morin to say hi to his friend Aki Hoshide.

Much to the crowd's entertainment Dr. Morin forgot to say "Over", after his message to Aki.

Ben was dressed in an astronaut flight suit and greeted Aki with “Konnichiwa.” Ben received a lot of attention by the press after the event.

Katie, a ham, immediately made her way to our demo ground station after the contact to make a contact with FO-29. At 12 she is really into making satellite contacts.

In addition to the contact I was involved with AMSAT and ARRL at the Youth Lounge in the center of the exhibition hall. I also had an opportunity to work with Mark Spencer WA8SME ARRL Education & Technology Program Director and Nathan McCray K9CPO ARRL Instruction and Resource Coordinator.

AMSAT also sponsored a portable satellite ground station in addition to the ground demo we set-up for the contact. Tom Deeble KA6SIP who was given permission to operate as W1AW/6. I need to also thank Dale Hunzeker KJ6VUC who ably assisted me with my responsibilities with the youth lounge and STEM development.

What an experience! 🌐



EMike McCardel, KC8YLD (right) helping teachers make Cubesat models.



Deployable satellite antennas brought by Joe Spier, K6WAO.



Tom Deeble, KA6SIP with his portable satellite ground station operating as W1AW at PACIFICON 2012

By Bruce Paige, KK5DO
AMSAT Director of Contests and Awards

Once again, mosquitos, rain, and heat have graced our Field Day. This year had to have been one of the closest races for the brass ring that I have scored since I took over this job. There were four clubs neck and neck down to the wire.

We had lost AO-51 and I thought that might change the results of Field Day. However, thinking about it, AO-51, if it were in dual mode, would only account for 2 contacts. This year, there were 9 satellites in use. I count the satellites based on their modes as you can make contacts using both modes. AO-27 has one FM transponder and I count that as one satellite whereas AO-07 has two modes, SSB and CW and gets counted as 2 satellites.

We had the most satellites in use back in 2009 and 2010 with 12 different satellites. In 2011 and 2012, we had 9 different satellites.

The number of participating AMSAT Field Day stations has remained pretty constant over the years as evidenced by the table below. QSO count was down from previous years.

As with every year, who was the number one station at Field Day. This year, moving up from 3rd place last year is the San Lorenzo Valley Amateur Radio Club operating as K6MMM with 58 points (10 more points than their 2011 score). This knocked last year's winner, the Houston QRP Club, using the call W5MSQ down to 2nd place with a score of 53 points (way down from their 92 points in 2011).

Between 2nd, 3rd, and 4th place there was only a difference of several points, so close, I actually had to request information from some of the clubs to verify their scores. Taking 3rd place was the Stanford University Amateur Radio Club operating as W6YX who was in a tie last year for 2nd place made a score of 52 points, down from their 92 points last year. Finally 4th place this year went to the Huntsville Amateur Radio Club, operating as K4BFT, with 50 points, with 2 points more than last year.

There were no stations operating from home with emergency power this year.

The 9 satellites in operation this year were AO-27, SO-50 (both in FM), AO-07, FO-29 and VO-52 (all in SSB and CW), and the ISS (in APRS). Yes, one station, W6YX, chose to listen for the ISS and made

one APRS contact. Take a look at their satellite antennas (photo 1) with 150 feet of coax running to them. That gave them only 20 watts at the antenna. Here is a transcript of that contact:

That one contact earned W6YX 3 points and pushed them barely into 3rd place. They were operating as a 3F station from an EOC and had a bunch of kids participating (photo 2).

Breaking down the contacts, FO-29 phone carried most of the Field Day contacts with 90 reported.

At the Brazos Valley Amateur Radio Club, KK5W, they had their satellite antennas mounted on a trailer. Take a look at Kirk, KK2Z, setting them up (photo 3). The San Lorenzo Valley Amateur Radio Club, K6MMM, bought a nice little trailer before field day (photo 4). However, even with their new setup (photo 5), John, KJ6ZL, said that their station worked fine but bad protocol being used on the satellites made it difficult to sort out and they cannot wait until next year.

The North Fulton Amateur Radio League, K4JJ, in Georgia, participated for the first time in AMSAT Field Day. They used an FT-817 and an Arrow antenna. They put the satellite station where people could see what

	2005	2006	2007	2008	2009	2010	2011	2012
Satellites	10	10	7	8	12	12	9	9
QSO's	120	258	207	220	328	387	335	263
Stations	11	21	13	17	20	18	14	19

Table 1: Comparing Field Day Entries By Year

AO-27	SO-50	AO-07 Phone	FO-29 Phone	VO-52 Phone	AO-07 CW	FO-29 CW	VO-52 CW	ISS APRS
9	11	64	90	56	16	8	8	1

Table 2: 2012 Number of Field Day Contacts by Satellite



was going on and it was a major attention getter says John, K4SQC.

As with previous year's, we could not miss the United Radio Amateur Club, K6AA, operating from sunny California with their famous pink flamingos. Operating at night from the Milwaukee Repeater Club, WI9MRC, Field Day site was Ted, N9KQQ (photo 7).

The Lockheed Martin Amateur Radio Club, W5IU, participated again this year and here is a picture of Keith, W5IU, at their Field Day location (photo 8). We had an entry from Hector, CO6CBF, in Cuba. Hector was the only international submission this year.

K4BFT, Tim, N8DEU, had this to say about Field Day this year, after taking 2 days to find all the equipment and spending a couple of hours to work out the kinks in the Fox Delta ST-1 controller interface they finally got it working. They were set up at the Alabama Space and Rocket Center but missed several passes. Yes, look out for Murphy, they had bad keps in SatPC32. After another couple of passes with poor results, they removed the preamp on the 70cm uplink and finally made some AO-07 contacts.

The Houston QRP Club, W5MSQ, also saw Murphy when trying their first V/U contact. It appears a high SWR nixed that and a backup antenna had to be used, which was missing the phasing harness. This left them with basically a single plane yagi for 2m. They did much better in mode U/V. Here is the W5MSQ operating site (photo 9) and their refreshment center (photo 10).



Photo 1: (left) The satellite antennas at W6YX. They also made a contact via the ARISS digipeater on the ISS.

Photo 2: (right) The operating position at W6YX in the EOC. They also gave youngsters an opportunity to participate.



Photo 3: (left) The Brazos Valley Amateur Radio Club's satellite trailer. Kirk, KK2Z setting up.

Photo 4: (right) Lorenzo Valley Amateur Radio Club's K6MMM trailer set up for satellite operations.



Photo 5: (left) The operating position inside K6MMM satellite station.

And finally, a pair of dipole antennas from the Houston QRP Club field day site. This writer had difficulty in differentiating the 2m from the 70cm (photo 11).

Next year, as I have said many, many years before, I hope that we have even more participants in the AMSAT Field Day. Hopefully, Murphy will not visit your Field Day site. But if he does, be prepared.

Here is a table of all entries received. In the case of a tie, the call signs are listed alphabetically.

1	K6MMM	3A	58
2	W5MSQ	2A	53
3	W6YX	3F	52
4	K4BFT	4A	50
5	K6AA	3A	29
6	K4JJ	4A	16
7	WC5C	4F	15
8	W5IU	4A	13
9	WI9MRC	4A	8
10	CO6CBF	1E	7
11	K8UNS	4A	7
12	WD9EWK	1B	6
13	K2IRT	3A	4
14	K5DX	1A	4
15	KK5W	5A	2
16	K9MOT	1A	2
17	VE3RAM	2A	1
18	VE9EMM	2A	1
19	W4EM	3A	1



Photo 6: (left) United Radio Amateur Radio Club, K6AA.

Photo 7: (right) Ted, N9KQQ operating from the satellite station at the WI9MRC Milwaukee Repeater Club site.



Photo 8: (left) Keith, W5IU at the satellite station of the Lockheed Martin Amateur Radio Club.

Photo 9: (right) Operating site of the Houston QRP Club W5MSQ



Photo 10: (above) The W5MSQ refreshment center.



Photo 11: (left) Steak dinner on the hoof arriving at W5MSQ.

W6YX and KU6S QSO via ARISS packet - 3 points!

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Fm KU6S To APRS Via RS0ISS <UI pid=F0 Len=29 >[22:04:41] <<<< KU6S calling CQ
CQ FD de KU6S 4A EB (via ISS)
Fm KU6S To APRS Via RS0ISS* <UI pid=F0 Len=29 >[22:04:42] <<<< digipeated by ISS
CQ FD de KU6S 4A EB (via ISS)

Fm W6YX To APEG02 Via RS0ISS* <UI pid=F0 Len=14 >[22:04:56] <<<< digipeated by ISS (W6YX calling CQ)
CQ W6YX 3F SCV

Fm RS0ISS To CQ <UI pid=F0 Len=36 >[22:05:14] <<<< ISS Beacon
ARISS - International Space Station

Fm KU6S To APRS Via RS0ISS <UI pid=F0 Len=27 >[22:05:18] <<<< confirmation from KU6S to W6YX
:NWS :W6YX QSL DE KU6S
Fm KU6S To APRS Via RS0ISS* <UI pid=F0 Len=27 >[22:05:20] <<<< digipeated by ISS
:NWS :W6YX QSL DE KU6S
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Meet One of Our New Satellite Operators

By Allen Mattis, N5AFV

On August 28, 2012, Allen Mattis, N5AFV, an AMSAT Area Coordinator in Houston, had a satellite contact with Michael Mustachia, KF5PHA, on AO-27. Allen later learned that Michael lived in Houston and that it was Michael's first satellite contact. Michael was using an HT with an Arrow antenna when he made his first satellite contact. Michael, who is 73 years old, had only held his amateur radio license for four months when he made his first satellite contact. What is even more impressive is that Michael did not have a satellite Elmer helping him and on his first satellite pass he made three contacts.

Even though Allen and Michael are both members of the Brazos Valley Amateur Radio Club (BVARC), the largest amateur radio club in the Houston metropolitan area with over 200 members, they did not know each other. That changed at BVARC's September meeting when Allen presented Michael with AMSAT's Satellite Communicators' Club certificate. Thank you to John Papay, K8YSE, and Bruce Paige, KK5DO, AMSAT Director of Contests and Awards, for their assistance in recognizing Michael's accomplishment. 🌐



Michael Mustachia, KF5PHA (left), receiving AMSAT Satellite Communicators' Club certificate from Allen Mattis, N5AFV, AMSAT Area Coordinator (Photograph by Travis Burgess, K5HTB)



